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IRON TYPE GOLF CLUB HEAD WITH LOW PROFILE TUNING PORT

BACKGROUND OF THE INVENTION

This invention relates generally to golf equipment and, in particular, to an iron type golf club head with a low profile tuning port.

U.S. Patent No. 6,206,790 to D. J. Kubica et al discloses an iron type golf club head having a primary cavity formed in its back face by a perimeter weighting element which protrudes rearwardly from its front face. A secondary cavity or tuning port for containing a weight adjustment member is defined within the primary cavity by an interior wall which is connected at one end to the perimeter weighting element adjacent a heel portion of the club head and at the other end to the perimeter weighting element adjacent a toe portion of the club head. The interior wall is integrally formed on a bottom surface of the primary cavity and extends from the bottom surface of the primary cavity in a direction that is substantially perpendicular to the front face of the club head.

SUMMARY OF THE INVENTION

An iron type golf club head includes a body having a front face arranged for impact with a golf ball, a back face, a sole, a top rail, a heel portion and a toe portion. A hosel having a longitudinal axis is connected to the heel portion of the body. A perimeter weighting element

protrudes rearwardly from the front face and defines a primary cavity in the back face. The perimeter weighting element includes a top rail and a sole which extend between the body heel and toe portions along an upper portion and a lower portion, respectively, of the body. An interior wall extends from a first end connected to the perimeter weighting element adjacent the body heel portion through the primary cavity between the top rail and the sole to a second end connected to the perimeter weighting element adjacent the body toe portion defining an elongated secondary cavity or tuning port within the primary cavity. A weight adjustment member is disposed in the secondary cavity. The interior wall is integrally formed on a bottom surface of the primary cavity and extends from the bottom surface of the primary cavity in a direction that is substantially perpendicular to the longitudinal axis of the hosel. This orientation of the interior wall provides the secondary cavity, i.e. the tuning port, with a low profile while also moving the center of gravity of the club head lower and farther away from the front face.

DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an iron type golf club head according to the present invention;

Fig. 2 is a toe end view of the golf club head of Fig. 1;

Fig. 3 is a heel end view of the golf club head of Fig. 1;

Fig. 4 is top view of the golf club head of Fig. 1;

Fig. 5 is a bottom view of the golf club head of Fig. 1;

Fig. 6 is a front elevational view of the golf club head of Fig. 1;

Fig. 7 is a rear elevational view of the golf club head of Fig. 1; and

Figs. 8, 9 and 10 are sectional views taken along lines 8-8, 9-9 and 10-10 in Fig. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figs. 1-7, an iron type golf club head 10 includes a body 12 and a hosel 14 with a cylindrical bore 15 for receiving one end of a golf club shaft 13 (Fig. 7). Although the club head 10 is shown as a six-iron, it could also be any iron-type club head from a one-iron to a wedge. The body 12 has a heel portion 16 and a toe portion 18 that are spaced apart. The hosel 14 has a longitudinal axis A (Fig. 9) and includes a neck 20 connected to the heel portion 16 of the body 12. The club head 10 is preferably cast from suitable metal such as stainless steel. A front face 22 arranged for impact with a golf ball (not shown) is provided on the body 12 and extends between the body heel and toe portions 16, 18 along a frontal portion of the body 12. Disposed rearwardly of the front face 22 is a back face 23. When viewed as in Fig. 6 from a direction which is generally normal to the front face 22, the neck 20 has an upper surface 20a and a lower surface 20b.

A perimeter weighting element 24 protrudes rearwardly from the front face 22 and defines a primary cavity 26 in the back face 23. The perimeter weighting element 24 includes a top rail 28 and a sole 30. The primary cavity 26 is defined at its upper extremity by the top rail 28 and at its lower extremity by the sole 30. The top rail 28 extends between the body heel and toe portions 16, 18 along an upper portion of the body 12, and the sole 30 extends between the body heel and toe portions 16, 18 along a lower portion of the body 12.

The sole 30 has a lower trailing edge 32 and a lower backsurface 34 of the perimeter weighting element 24 is located adjacent the lower trailing edge 32. This lower backsurface 34

preferably slopes upwardly and inwardly from the trailing edge 32 toward the front face 22. The lower backsurface 34 merges with a lower inner surface 36 of the perimeter weighting element 24 along an upper trailing edge 38 of the sole 30.

As seen in Figs. 4 and 6, grooves 40, 42 are formed in the front face 22 of the body 12. The grooves 40, 42 are elongated in a direction extending between the heel and toe portions 16, 18 of the body 12 and include the grooves 40 of equal length and the grooves 42 of varying length.

The primary cavity 26 defined by the perimeter weighting element 24 has a bottom surface 44. Formed integrally on the primary cavity bottom surface 44 is an interior wall 46 that extends from a first end 46a located adjacent the body heel portion 16 through the primary cavity 26 between the top rail 28 and the sole 30 to a second end 46b located adjacent the body toe portion 18. The first and second ends 46a, 46b of the interior wall 46 are integrally connected to the perimeter weighting element 24 adjacent the body heel and toe portions 16, 18 defining an elongated secondary cavity or tuning port 48 within the primary cavity 26. The inner surface 36 of the perimeter weighting element 24 is disposed between the first and second ends 46a, 46b of the interior wall 46 and forms a lower extremity of the secondary cavity 48. An inner surface 50 of the interior wall 46 forms an upper extremity of the secondary cavity 48. The interior wall 46 has a height dimension H (Fig. 9) that varies between its first and second ends 46a, 46b as seen in Fig. 1. It will be understood that the height dimension H of the interior wall 46 is greater at the second end 46b which is adjacent the body toe portion 18 than at the first end 46a which is adjacent the body heel portion 16. The interior wall 46 extends from the bottom surface 44 of the primary cavity 26 in a direction D (Fig. 9) that is substantially perpendicular to the

longitudinal axis A of the hosel 14. This orientation of interior wall 46 provides the secondary cavity 48, i.e. the tuning port, with a low profile while also moving the center of gravity of the club head 10 lower and farther away from the front face 22 for improved performance.

A weight adjustment member 52 (partially broken away in Fig. 1), such as disclosed in U.S. Patent No. 6,206,790 to D. J. Kubica et al and incorporated herein by reference, having a predetermined volume is disposed in the secondary cavity 48 and is secured therein by suitable adhesive such as epoxy. The weight adjustment member 52 is selected from a plurality of weight adjustment members (not shown) that have the same predetermined volume but have different densities and thus different weights. This plurality of weight adjustment members preferably covers a range from about four grams to about thirty grams in one gram increments. This range of weights should be sufficient to cover different shaft lengths and different types of shafts that may be attached to the club head 10. Therefore, the desired weight of the club head 10 may be adjusted without changing the predetermined volume of the weight adjustment member 52. By selecting a weight adjustment member 52 of proper weight, manufacturing tolerances can be overcome and the swingweight of a golf club may be fine tuned. The weight adjustment member 52 is preferably formed of plastic. Since the weight adjustment member 52 is located near the center of gravity of the club head 10, the club head center of gravity will not change significantly when selecting any of the plurality of weight adjustment members.

In order to provide loft and lie adjustment of the club head 10, a notch 54 formed in the lower surface 20b of the hosel neck 20 allows bending of the hosel 14 at the neck 20 with no bending of the portion of the hosel 14 containing the bore 15. Such a notch is disclosed in U.S. Patent No. 6,186,903 to L. C. Beebe et al, incorporated herein by reference.